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ABSTRACT

This paper introduces and develops the premise that technology should be used as a tool to be adapted to early childhood education rather than adapting the preschool curriculum to computers. Although recent evidence suggests a national interest in having high technology play a role in the teaching of young children, particularly in reading, writing, and math, conflicting evidence suggests that the most essential development for preschool children takes place in other areas. Therefore, it is argued that technology use with preschoolers should focus on the essential tasks that need to be accomplished by young children. Such areas as the development of perceptual and cognitive skills, productive and receptive language skills, competence motivation, appreciation of feelings, acquisition of general knowledge, motor coordination, and the understanding of social interactions have usually been regarded as primary foci in programs for young children. This paper describes a modest evaluation of the possibilities of computers relating to children through conversation, visual representation, and movement. (DST)

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Making the Computer Fit the Child Rather than the Child Fit the Computer: Conversations between Children and Robots

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Recent evidence suggests that there is national interest in having high technology play a role in the teaching of young children (Papert, 1980; Dusewicz, 1982; Ross & Campbell, 1982; Brady & Hill, 1984; Chattin-McNichols, 1984). Many programs that are being developed for young children are designed to teach reading and writing or formal mathematical skills. However, there is considerable evidence that the most essential development for preschool children needs to take place in other areas (Piaget, 1970; Cahoon, 1974; Anderson & Draper, 1977). Given this, it makes sense for the use of technology with preschoolers to focus on the essential tasks that need to be accomplished by young children. Such things as the development of perceptual and cognitive skills, productive and receptive language skills, competence motivation, appreciation of feelings, acquisition of general knowledge, motor coordination, and the understanding of social interactions have usually been regarded as primary foci in programs for young children.

It is assumed that young children will benefit most from instruction that emphasizes the skills, attributes, and strategies that have traditionally been part of quality preschools. Therefore, it is on these traditional tasks that we intend to focus our questions about the usefulness of high technology with young children. In our view it makes more sense to attempt to adapt technology as an assisting tool in completing the central tasks of early childhood than it does to adapt the preschool curriculum to those things that computers naturally do well. In order to do this, attention must be given to the special needs and abilities of young children as well as to the special requirements and limitations of computers.

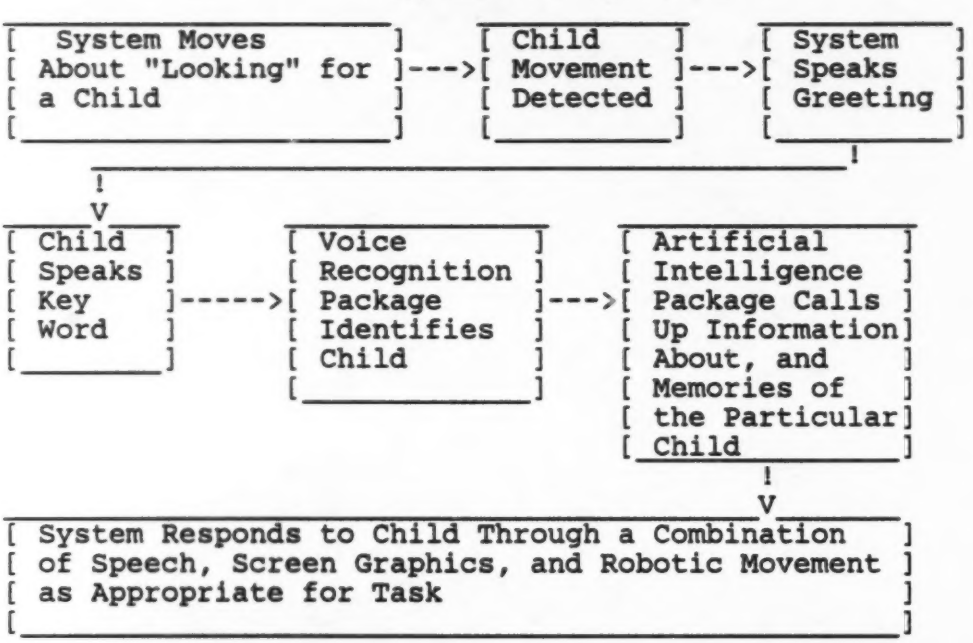
With the advent of computer driven speech synthesis, speech digitization, voice recognition, sophisticated graphics, robotic movement, and ultrasonic motion detection it is now possible, in theory, to send information between children and computers in ways that are more natural than the keyboard and the video screen, and more in keeping with the multisensory learning styles of young children. Using existing technology with existing

artificial intelligence programs it is theoretically possible to allow computer to relate to children through conversation, visual representation, and movement. At BYU we are beginning a modest evaluation of some of these possibilities. We are attempting to determine the degree to which current technology can be used to accomplish the tasks that we have been traditionally regarded as central to a good preschool program.

Basic Equipment

Computer: IBM-PC with color monitor and graphics board
Voice Recognition and Digitization: Votan VPC-2000 board for the IBM-PC
Robotic Movement: Heathkit/Zenith Hero I Personal Robot with voice synthesizer and radio control compatible with the IBM-PC
Artificial Intelligence: Golden Common LISP
Additional Software: public domain graphics packages

System Configuration


System Moves About "Looking" for a Child
Child Movement Detected
System Speaks Greeting
Child Speaks Key Word
Voice Recognition Package Identifies Child
Artificial Intelligence Package Calls Up Information About, and Memories of the Particular Child
System Responds to Child Through a Combination of Speech, Screen Graphics, and Robotic Movement as Appropriate for Task

Our decision to examine this topic in not an endorsement of high technology for use in preschools. Our interests are academic and exploratory. We find the use of technology with children a fascinating area that is beginning to stimulate a controversy of some proportion. In addressing the issues we wish to be as well informed as possible. Our initial observations suggest that high technology has not progressed to the point where it is practical in accomplishing the traditional goals of a quality preschool with any degree of efficiency. Nevertheless,

we have found that some children can learn elements of the traditional curriculum from robotic instructors. The learned concepts go beyond simple new facts about robots and computers, and include lesson content unrelated to technology.

Robotic instruction and artificial intelligence have a long way to go before they can rival the rapid and accurate intuitive judgments of a skilled teacher. However, as long as the pros and cons of using technology with young children are being discussed, we would hope to be of service by providing some careful and systematic observations about what is possible and what is practical.

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